I CLAIM

1. A tunable chromatic optical signal dispersion compensator comprising

three cascaded Mach-Zehnder interferometers, MZIs, a first MZI including a fixed 50/50 coupler for receiving an input optical signal, a second MZI including a first adjustable coupler that is shared with the first MZI and a second adjustable coupler that is shared a third MZI, and the third MZI including a fixed 50/50 coupler for outputting a dispersion-adjusted output optical signal and

wherein said first and second shared adjustable couplers are adjusted with equal coupling ratios using a single control signal to provide adjustable dispersion compensation to the output signal.

2. The optical signal dispersion compensator of claim 1 wherein the first and third MZIs have a path-length difference ΔL and the second MZI has a path-length difference $2\Delta L$.

3. The optical signal dispersion compensator of claim 1 wherein when the two adjustable couplers are set to a 100/0 coupling ratio, the optical signal dispersion compensator has zero dispersion and wherein the dispersion can be tuned positive or negative by adjusting the two adjustable couplers towards a 50/50 coupling ratio.

4. The optical signal dispersion compensator of claim 1 wherein each of the two adjustable couplers is implemented using an MZI with phase shifters.

5. The optical signal dispersion compensator of claim 4 wherein the phase shifters of each of the two adjustable couplers uses thermooptic heaters operated in a push-pull manner by the single control signal.

6. The optical signal dispersion compensator of claim 1 implemented as a planar optical integrated circuit or using discrete optical elements.

7. The optical signal dispersion compensator of claim 1 being integrated as part of an optical apparatus consisting of one or more of the following optical components

an optical transmitter,

an optical amplifier,

an optical filter,

a wavelength multiplexer,

a wavelength demultiplexer,

and an optical receiver.

8. The optical signal dispersion compensator of claim 1 being used in a multi-wavelength channel system, the optical signal dispersion compensator having a free-spectral range equal to the system channel spacing divided by an integer.

9. A reflective tunable chromatic optical signal dispersion compensator comprising

a first MZI including a fixed 50/50 coupler for receiving an input optical signal at a first port and an adjustable coupler, that is shared with a second reflective MZI, the path-length difference between the two arms in the second MZI is equal to that of the first MZI and

wherein the adjustable coupler is responsive to a control signal for controlling the amount of signal dispersion added by said compensator to the input optical signal to form the output optical signal.

10. A method of operating a tunable chromatic optical signal dispersion compensator comprising the steps of:

receiving an input optical signal and introducing a fixed amount of signal dispersion thereto to produce a second optical signal,

controlling the amount of signal dispersion added to the second optical signal using a single control signal to produce a third optical signal, and

controlling the amount of signal dispersion added to the third optical signal to produce a dispersion compensated output optical signal.